# THE INSECT PEST SURVEY BULLETIN

A periodical review of entomological conditions throughout the United States, issued on the first of each month from March to November, inclusive.

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| Wisconsin | Prof. S. B. Fracker, State Entomologist, State Department of Agriculture, Madison. |
| | Prof. H. F. Wilson, Entomologist, University of Wisconsin, Madison. |

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| Wyoming | Mr. C. L. Corkins, Agricultural Experiment Station, Laramie. |
| Washington | Prof. R. L. Webster, Head Dept. of Zoology, State College of Washington, Pullman, Washington. |

I N S E C T  P E S T  S U R V E Y  B U L L E T I N

Vol. 6 March 1, 1926 No. 1

# OUTSTANDING ENTOMOLOGICAL FEATURES IN THE UNITED STATES FOR NOVEMBER AND DECEMBER, 1925, AND JANUARY, 1926

The present departure in issuing a midwinter number of the Insect Pest Survey Bulletin is the result of a conference of the Survey workers held in connection with the annual meetings of the American Association of Economic Entomologists at Kansas City, Mo., this winter.

It was felt that a summary of the known conditions of several of our more important insect pests throughout the country would be of material assistance to the workers in outlining their program for the coming spring and summer.

From the reports received it would appear that the Hessian fly is at a very low period of its abundance in the Middle Atlantic and East-Central States, as well as in the Lake region, with the exception of Illinois, where early sown wheat shows heavy infestation. The low ebb seems to extend southward through Missouri and westward to South Dakota and Nebraska. The situation in Kansas, however, is much more critical and reports in general indicate serious abundance over the greater part of the State. On the west coast reports indicate that abundance of the fly is below normal in Oregon and California.

The chinch bug situation is generally favorable over the East-Central States, becoming more serious at the western extremity of its distribution in Nebraska and Kansas.

The greenbug is reported only from small areas near Sherman and Rochelle, Tex.

The grasshopper situation in general appears to be favorable. A somewhat severe infestation may be expected in Hill County, Mont., next season.

The San Jose scale is reported as slightly more prevalent than a few years ago in Connecticut and Rhode Island, whereas the general upward trend noted in New York State and Pennsylvania the last few years seems to be receding. In Virginia and Georgia the scale is decidedly more serious than usual. In the East-Central States the scale is on the increase in Illinois, while northwest of this region in Wisconsin, Minnesota, and Iowa the insect is not serious. South of this region in Missouri, Arkansas, and Kansas the insect, though present in practically all orchards, seems to be well under control. In the Pacific Northwest, Idaho reports that the scale was very materially set back by the severe winter of 1924-25.

The boll weevil situation does not appear serious in the fringe States which border its range. In Arkansas considerably more weevils went into hibernation than in the fall of 1924. The same condition prevails in Louisiana and Texas.

HESSIAN FLY (Phytophaga destructor Say)

MIDDLE ATLANTIC STATES

C. C. Hill: Surveys of the principal wheat-growing regions of the States of New York, Pennsylvania, Maryland, Delaware, and Virginia show a very low infestation from the Hessian fly throughout these regions. For a number of years the prevailing practice in these sections has been to sow wheat after the fly-free date, and there is every evidence that the present light infestation of the fly is due to this policy. Although the fly is universally present in small numbers, yet even the early sown fields showed very light infestation.

New Jersey

Thomas J. Headlee (Letter dated January 16,1926): This insect is not sufficiently abundant in this State to threaten injury.

Virginia

W. J. Schoene: We have no recent reports on the Hessian fly.

EAST-CENTRAL STATES

W. B. Cartwright: All available records show no infestation of the Hessian fly to wheat sown after the recommended dates. In most of the localities represented by the survey it appears that the wheat could have been drilled a few days earlier than the safe seeding dates. However, in locations from which egg deposition records supplemented the other fly records, infestation by fly eggs occurred on the sowings just prior to these dates, whereas later records showed no resultant larval infestation. The inference is that the young larvae were killed by the freezes and hostile weather conditions of October.

Infested volunteer wheat in stubble and fallow fields has formed a basis at least for a minor spring brood of flies, but no damage is foreseen. In the fall wheat sowings the fly is at a low mark but unfortunately the adverse season for seeding wheat and the possible winter kill to the delayed sowings in the northern section have overshadowed the success against the Hessian fly. To date there has been no evidence of winter kill of wheat plants or retardation of growth.

Kentucky

H. Garman: I have had no complaints of the Hessian fly recently and from all indications it has been rather scarce in this State.

Michigan

R. H. Pettit: The Hessian fly seems to be present in small numbers except that in three localities it seems to be fairly plentiful. Albion, Kalamazoo, and Battle Creek showed moderate numbers here and there this last fall. During the spring we examined into the situation in quite a few counties and encountered them only in the districts named.

Wisconsin

C. L. Fluke: The Hessian fly has now become quite generally distributed over Wisconsin, but is very seldom a severe pest. During the fall of 1923, conditions were ideal for

egg laying; as a result, during the summer of 1924, this insect was quite numerous over most of the wheat districts of the State. That fall and this past fall the season was quite cold and rainy, with the result the Hessian fly was present in very small numbers this past year and our counts this fall show even less infestation.

A. A. Granovsky: Being attached to one of the branch experiment sstations, which is located at Sturgeon Bay, Door County, Wis., I had the opportunity to observe considerable damage caused by the Hessian fly during the summers of 1923-24. This last summer, 1925, the Hessian fly was a very unimportant factor, though present in a few grain fields. The only reason that I can think of for the reduction of the Hessian fly infestation this last summer is the fact that we had a prolonged rainy season in 1924. This, no doubt, prevented the Hessian fly from oviposition on fall wheat seedlings.

S. B. Fracker: This insect is rare in Wisconsin and has not been of economic importance for several decades. Wisconsin grows only 65,000 acres of winter wheat and this is widely scattered in localities varying from year to year. Since the insect pest survey was established, the Hessian fly has been collected in Richland County in 1921, in Dane County in 1922, and in Trempealeau and Door Counties in 1923 and 1924. There are no notes for 1925 except the observations of A. A. Granovsky of the agricultural experiment station at Sturgeon Bay.

Illinois — W. P. Flint: The examinations of early sown wheat fields in all parts of the State have shown a heavy infestation by the Hessian fly in all wheat sown up to within a week or five days of the normal fly-free date. Wheat sown after the fly-free date, or a few days before, shows almost no infestation. Apparently in the early sown fields, numbers of the eggs and very small larvae were killed by the unusually cold weather occurring during October. The fly is practically all in the large maggot or flax-seed stage, and there is every indication that it will survive the winter. Volunteer wheat is not quite so abundant as in the fall of 1924, but is present in many fields in sufficient quantity to carry through a considerable brood of the fly to next spring.

Minnesota — A. G. Ruggles: The Hessian fly has not given us any serious trouble for a number of years. I have seen it in winter wheat several times but the damage was not at all serious.

Iowa — Carl J. Drake: Iowa suffered no commercial Hessian fly losses in 1925. This is the result of an intensive Hessian fly campaign carried on during the last three years. From 90 to 100 per cent of the farmers in the principal winter-wheat-growing region of the State cooperated and in the fall of 1924 put off drilling until the safe date was announced.

The past fall, 1925, some of the farmers in Plymouth, Monona, and Harrison Counties drilled a little too early and there will

undoubtedly be a little commercial damage in these counties. Very little winter wheat was sown in Plymouth and the farmers felt that it would not be necessary to observe the safe-seeding date. Although the acreage is very small in this county a few fields are badly infested. A general Hessian fly survey will be made this spring.

Missouri — L. Haseman: Stubble records last summer showed practically no infestations, and young plants from experimental fields this winter show no infestations; 50 to 75 per cent of wheat was seeded and most of it very late owing to prolonged wet weather this fall. Reported from Nodaway, Jasper, Johnson, Greene, Boone, Crawford, St. Louis, and Mississippi Counties.

J. R. Horton: "Fly" at extreme minimum abundance in southeastern Missouri; little wheat sown, none before earliest safe date, because of continuous rains during seeding period in southeastern Mo. Very few exceptionally early sown fields in southwestern Missouri, but these dangerously (upwards of half the stems) infested; wet weather very fortunately prevented sowing until long after the earliest safe date in southwestern Mo., - too long for best entry of wheat into winter. "Fly" at minimum abundance in northern Missouri; practically no fly in early sown or volunteer wheat; much wheat sown early, into winter in sturdy condition.

South Dakota — H. C. Severin: The Hessian fly is found in South Dakota but has not appeared in any numbers warranting any alarm.

Nebraska — M. H. Swenk: In general the Hessian fly is present in reduced numbers as compared to a year ago. Large areas of heavily infested territory are much less numerous, though of course in a number of localities there are plenty of fly puparia in the wheat at this time.

Kansas and Oklahoma — J. R. Horton: Abundance in general high, increasing, peak not yet reached. Early sown wheat - from one-fourth to one-half of stems infested in southern Kansas and northern Oklahoma. Wheat into winter in good condition except that considerable has been killed by fall brood larvae.

Kansas and Nebraska — J. R. Horton: "Fly"at minimum abundance. Early sown wheat generally not at all or but slightly infested in northeastern Kansas and southern Nebraska. Most of the wheat "safe" sown; rather poor growth for entering winter.

Northwestern Kansas — J. R. Horton: Abundance high, perhaps approaching peak; except in extreme northwestern counties. Early sown wheat over northwestern Kansas about half or more of stems infested - except in northwestern counties, negligible. Most of wheat "safe" sown, into winter in sturdy condition. Earliest safe sowing data - no infestation, any locality, on or after this date.

Kansas — J. W. McColloch: A survey of the Hessian fly situation made

during December shows that conditions are still serious over most of the State. Kansas has planted 11,395,000 acres to wheat and approximately 8,000,000 acres lie in territory where the fly is present. Several interesting conditions have arisen this year. September was one of the warmest and wettest Septembers on record. Two periods of generaly heavy rains over the State brought about a simultaneous emergence of the fly over practically all of the wheat area. So far as we can determine, very few flies emerged after September 28. In eastern Kansas, very little wheat had been planted at this time, and as a result, the regular sown crop is comparatively free of the fly. There is a large amount of volunteer wheat, however, and this is heavily infested. In the western half of the State, wheat sowing was well along in many counties by September 26, and there is a heavy infestation in the regular crop. The warm, wet September was followed by the coldest October on record for the State. As a result, the maggots developed slowly and very few had reached the flaxseed stage by December 1. For the most part, the maggots were from one-half to full grown on this date. It is going to be of considerable interest to follow this situation through the winter and observe the results in the spring.

The following records give some idea of the infestation with fegard to date of seeding based on experimental plots:

| | Planted | Per cent Plants infested | Per cent Plants dead |
|---|---|---|---|
| Ford Co. | Sept. 1 | 100 | 50 |
| | Sept.18 | 5 | |
| | Sept.25 | 0 | |
| Commanche Co. | Sept.18 | 30 | |
| | Sept.25 | 13 | |
| | Oct. 2 | 0 | |
| Clark Co. | Sept.26 | 27 | |
| | Oct. 2 | 0 | |
| Rice Co. | Sept. 1 | 30 | |
| | Sept.13 | 25 | |
| | Sept.25 | 5 | |
| | Sept.20 | 50 | |
| | Sept.30 | 0 | |
| Barton Co.* | Sept.12 | 90.3 | 90 |
| | Sept.19 | 60.4 | |
| | Sept.26 | 15.0 | |
| | Oct. 3 | 0.0 | |

* Average of four tests

| | | |
|---|---|---|
| Rush Co. | Sept.17 | 67 |
| | Sept.24 | 33 |
| | Oct. 1 | 1 |
| | Oct. 9 | 0 |

| | | |
|---|---|---|
| Ness Co.* | Sept. 10 | 74 |
| | Sept. 20 | 52 |
| | Sept. 23 | 33 |
| | Sept. 23 | 0 |

* Average of two tests

In Butler, Chase, Greenwood, and Harvey Counties, no fly was found in the date-of- seeding test, owing to the fact that all the plots were sown after September 26. Examination of early sown fields and of volunteer wheat showed a very heavy infestation. One field in Butler County, sown September 20, had every plant infested. (January 22): We have a report of the Hessian fly from Garden City, Finney County, Kans.; this extends the range of the fly about 30 to 40 miles farther westward in this particular section of the State. The wheat which was sent in contained many flaxseeds, and the county agent states that in this particular field the wheat is very small, and much of it appears to be dead.

Oregon — Max M. Reeher: Our counts of the Hessian fly on spring wheat in the lower Willamette Valley for the season 1925 varied from 2½ per cent of the plants and 0.9 per cent of the tillers to 50 per cent of the plants and 23 per cent of the tillers. The average of all fields counted was 25.6 per cent of the plants and 11 per cent of the tillers. For comparison the 1924 counts varied from 11 per cent of the plants and 0.9 per cent of the tillers to 73 per cent of the plants and 29 per cent of the tillers, the average being 35 per cent of the plants and 18 per cent of the tillers. On account of the dry fall there was very little volunteer wheat and most of the plowing and seeding of winter wheat was delayed until too late to become infested. The dry weather also resulted in a light fall emergence of the fly, so that next year's infestation will probably come from flaxseeds lying over in the old stubble from the previous seasons.

California — T. D. Urbahns: The Hessian fly is limited in its destructive abundance to the wheat growing areas of the counties bordering the lower Sacramento River and San Francisco bay districts, and also San Benito and Sonoma Counties and possibly, to a slight extent, some of the other coast counties. In these localities the Hessian fly is active in the fall, winter, and spring, and spends the summer months in the flaxseed stage.

C. M. Packard: The Hessian fly puparia are still mostly quiescent in last season's stubble. An insignificant number pupated during December, but practically no infestation of young wheat has yet occurred. Throughout most of the region where it occurs the infestation last year was very light, few live puparia are now pfesent in the stubble, and injury to the current crop is very improbable. In occasional stubble fields, especially in the Montezuma Hills district of Solano County, enough live puparia

are present to produce material infestations in adjacent young wheat if weather favorable to fly activity occurs during the Spring. The fact that growth of wheat has been delayed by continued drought and low temperatures will make it somewhat more susceptible to injury than usual.

CHINCH BUG (Blissus leucopterus Say)

Michigan — R. H. Pettit: The chinch bugs were not very troublesome in the southeastern part of the State. In Monroe County, Hillsdale County, and Lenawee County, I believe, they were present in moderate numbers.

Kentucky — H. Garman: The chinch bug is not commonly troublesome here, but during periods of special abundance in States north of us it sometimes appears in our northern counties.

Illinois — W. P. Flint: Examinations of chinch bugs in hibernation have shown that the bugs are in good condition. There will probably be no general outbreaks over Illinois next year, but scattered areas of from a township to half a county will have some injury by this insect. Our survey of bugs in hibernation to date has shown such areas scattered throughout the central part of the State, and as far north as Grundy County. The numbers of bugs in hibernation would not indicate any serious trouble next spring, unless the weather is dry, and warm, and favorable to the bugs after they first come out of winter quarters.

Iowa — Carl J. Drake: The chinch bug situation is not serious and there will probably be no serious chinch bug outbreaks in the State. In the three southeastern counties, Appanoose, Davis, and Van Buren, we have received a few chinch bug reports but the infestation is light. Weather conditions during the last two years have controlled the chinch bugs in Iowa.

Missouri — L. Haseman: A survey of Missouri indicates that the chinch bug is abundant and may cause an epidemic in a strip across the North-Central part of the State extending from Bates to Buchanan Counties on the west side to Marion and Pike Counties on the east side. A small localized outbreak may occur in Lawrence and Greene Counties in the southwestern corner of the State. The northern and southeastern part of the State did not seem seriously enough infested to cause alarm.

Arkansas — Dwight Isely: The past year there was the most severe injury by the chinch bug in the eastern part of the State which has occurred for many years. I do not mean that this injury is comparable with severe injury which may occur in Illinois or Kansas. In the East-Central part of the State chinch bugs were present in practically all fields of corn during June and July and in some instances cornfields were killed. There was considerable complaint from the chinch bug in the rice section, and chinch bugs were reported by A. H. Prince, county agent, at Stuttgart as actually

killing fields of rice before they could be flooded. As you may know, both the seasons of 1924 and 1925 were exceptionally dry and this factor was probably responsible for the unusual abundance of chinch bugs.

South Dakota — H. C. Severin: The chinch bug was quite a serious pest with us a few years ago, but has become a negligible factor during the past two years.

Nebraska — M. H. Swenk: As previously reported, the chinch bug went into hibernation in increased numbers the last fall over a large territory, but we are hoping that the character of the present winter will partly offset that advantage to the bugs by inducing an increased mortality.

Kansas — J. W. McColloch: Chinch bug conditions in Kansas are still serious. Large numbers of crops are to beffound in the clump-forming grasses throughout most of the eastern half of the State. In addition to the bugs hibernating in the grass, there are an exceptionally large number in the corn and sorghum fields. This is undoubtedly due to the fact that the low temperatures of October caught many bugs before they had time to migrate to the grassland. Thus far the mortality in the corn and sorghum stalks has been comparatively low.

In connection with the studies on Sudan grass stubble as hibernating quarters for the chinch bug, exceptionally large numbers have been found this year. Here, again, the mortality is low. Many counties have pushed the burning campaign, and in many areas all roadsides and waste areas have been burned.

## GREEN BUG (Toxoptera graminum Rond.)

Kentucky — H. Garman: The green bug has been giving considerable trouble recently on bluegrass in early spring. I found last season brown patches of the grass where it was especially common, and am looking for it again this season. I did not find it on the bluegrass in the fall and assume that it hibernates on wheat or other small grains and comes to the bluegrass only in early spring.

Wisconsin — C. L. Fluke: This aphid is becoming more numerous each year and this past summer it was quite common throughout the southern and eastern parts of the State and was considerably more numerous than it was last year.

Missouri — L. Haseman: Have observed none and have had no complaints about it this fall and winter.

Texas — F. L. Thomas: Mr. Gable has sent this office information with reference to green bug infestation which he investigated in a field near Sherman, Tex. This was a small infestation and was the only one which he could locate in that territory as a result

of the complaint which he received. Another occurrence which was reported came from Rochelle, Tex., in McCulloch County, and is apparently of greater extent. Immediately following this report a freeze occurred which eliminated all the bugs, according to the correspondent. It has been impossible for us to make personal examination of this place, but we are transmitting the information to Mr. Gable so as to keep him informed.

Colorado — C. P. Gillette: The green bug does some damage, especially to oats, nearly every spring in the southeastern part of the State, but we have had no complaints concerning its injury during the past summer, and I do not know of an infested field at the present time.

Arizona — Oscar C. Bartlett: The grain aphis seems to be a minus quantity this winter so far. Our winter grains are showing nicely. We have no reports so far of the grain aphis.

California — T. D. Urbahns: The green bug, although it probably occurs in small numbers during the winter and spring months, is not considered to be of economic importance in the State.

## GRASSHOPPERS (Acrididae)

GENERAL STATEMENT — W. R. Walton: General conditions as regards grasshopper infestation throughout the country were very favorable at the close of the year 1925.

Texas and Oklahoma — W. R. Walton: The season was marked by the occurrence of two regional outbreaks located in Texas and Oklahoma, respectively. The prompt marshalling of State and Federal forces, however, and the interference of fortunate weather conditions served to repress these outbreaks and there is no present indication of trouble there in the immediate future. An unusual incident related by Mr. C. H. Gable was a local outbreak of Schistocerca obscura, a true "bird grasshopper", 30 miles south of San Antonio, Tex. The insects were destroyed by spraying them with a 1-to-80 solution of cattle dip while they were roosting in the shrubbery. The spray burned the foliage but destroyed 85 per cent of the hoppers.

EASTERN STATES — W. R. Walton: Many sporadic cases of more or less serious injury to crops by grasshoppers were reported from the Eastern States during the course of the summer which was a dry one in most of that region.

Montana — W. R. Walton: A survey conducted in northern Montana during the fall indicates that a somewhat severe outbreak may be expected in Hill County of that State, and the State and Federal entomologists are planning to meet the emergency with a control campaign during the spring.

SAN JOSE SCALE (Aspidiotus perniciosus Comst.)

Connecticut

W. E. Britton: The San Jose scale is found on nursery stock during the annual inspection of nurseries, and occasionally small orchard trees are found badly infested with it. It is somewhat more prevalent than was the case four or five years ago, but has not increased to any such alarming extent as I am led to believe is the case in Indiana and Illinois, and no special treatment is required for its control. Our orchardists spray either with a miscible oil or with lime-sulphur mixture, but do not apply a dormant spray every season. So far as our observation go, it has about the same status as it had a year ago.

Rhode Island

A. E. Stene: Our observations indicate that there are slightly greater numbers of these insects in some places but there is no general statewide increase. We have received no complaints of damage from the scale from any section of the State.

New York

C. R. Crosby: In Columbia County the San Jose scale was present in some orchards but was held in check by spraying. The scale is found in many orchards in Dutchess County but as a rule it is not serious. A few orchards show a rather severe infestation but these for the most part have been more or less neglected in the past. This insect has also been showing up on the fruit in some orchards this autumn. The San Jose scale has been quite well controlled by spraying, making it difficult to find in Erie County. In some neglected orchards scales are found on more than 50 per cent of the fruit and on several of the limbs. Some scale injury was found in many orchards. The percentage thrown out of A grade would be very small as the injury is serious in only three of the commercial orchards. In Monroe County the scale is present but only occasionally in serious quantities, while in Nassau County it is present but did not appear in large numbers. In Onondaga County the scale was not serious in sprayed orchards, and could easily be found in unsprayed orchards. Practically absent from all orchards in Ontario County that have received the recommended delayed dormant lime-sulphur spray. Even many neglected orchards are almost free of this scale. Therefore the assistant advised quite a number of good growers to reduce the strength of lime sulphur in the delayed dormant spray to 1-40. This was only advised, however, when the growers were familiar with the pest and had made a thorough examination of the orchard or when the assistant had made such examination. In Orleans County the scale is not common but a few can be found in some orchards. In Wayne and Oswego Counties the scale was only noted in quantity in old neglected orchards. The young orchard found to be severely infested last year showed no evidence of the pest this year after a thorough application of 1-8 lime-sulphur in the delayed dormant the past two seasons.

P. J. Parrott: The situation with respect to the San Jose scale is more favorable for the orchardists of this State than

it has been for several years. In 1923 there were marked evidences that the insect was developing to destructive numbers and threatening to become again a pest of primary importance, especially in old apple orchards. However, the cool, short summer of 1923 had the effect of reducing the numbers of the hibernating forms, and while there was a sprinkling of the insect in all of the leading fruit-growing areas during 1924-25, the scale, generally speaking, caused very little spotting of apples during these seasons. The degree of infestation at present varies with different orchards, but there are undoubtedly enough of the insects present in some plantings, at least, to make it inadvisable for owners to take chances. Therefore past recommendations for the control of the pest still hold , lime sulphur at a dilution of 1-8 being the preferred treatment. In case of badly infested old apple orchards where the scale is now being held in check satisfactorily with lime-sulphur, lubricating miscible oil at the usual dilutions is worthy of serious consideration.

E. P. Felt: The San Jose scale is not particularly numerous in this section of the State and so far as I have been able to learn has not caused any serious damage.

New Jersey — Thomas J. Headlee: This insect is not sufficiently abundant in this State to threaten injury.

Pennsylvania — T. L. Guyton: In the general nursery inspection carried on by F. M. Trimble, Chief Nursery Inspector, it is reported that the San Jose scale has not increased in any of the nursery plots of the State. In reports from our field offices in Erie and Franklin Counties the condition is verified as expressed by our Mr. Trimble. In orchards which are sprayed regularly there is little damage by the scale, but in neglected orchards the scale is plentiful enough, causing the death of some trees.

Virginia — W. J. Schoene: The San Jose scale has caused more loss to commercial apple orchards during the latter part of the summer of 1925 than for many years. It seems that owing to the drought the insects continued to multiply and to spread from the twigs so that much fruit which would otherwise have been first class was damaged by the presence of the scales. It appears that the insect occurred all through the fruit sections.

North Carolina — Z. P. Metcalf: Mr. C. H. Brannon, Assistant Extension Entomologist, says that there are about the usual number of the San Jose scale in the orchards that he has examined.

Georgia — Haliard De LaParelle: While no definite survey has been made, I am satisfied from observation that this insect has been and is very prevalent and destructive in sections of the State which I have visited. I refer particularly to the peach district in the vicinity of Macon, Ga. In some orchards the trees were so heavily incrusted with this scale that the crop was seriously decreased and the trees nearly killed.

Florida — R. A. Knight: The San Jose scale is of quite common occurrence, principally in the northern parts of the State.

Ohio — J. S. Houser: Considerable complaint is being made by some of the orchardists in southern Ohio and particularly in Lawrence County that the scale is much worse than it has been for some years. In one instances several carloads of fruit shipped to New York for export were refused and returned to the shipper because the fruit was infested. It is asserted that engine-oil emulsion as well as lime sulphur has failed to control.

Kentucky — H. Garman: The San Jose scale is one of our common pests, but I do not think that it is as abundant as formerly. It seems to be kept very largely suppressed on some trees by small hymenopterous parasites.

Michigan — R. H. Pettit: The San Jose scale is practically everywhere where fruit is growing but we are hearing very little about it. Two or three years ago our growers had some difficulty in controlling it but at the present time the situation has settled down to a point where only a very few inquiries are received each year. I am unable to state whether this is due to the good work of natural enemies or to some other cause.

Illinois — W. P. Flint: An examination of overwintering scale from southern and central Illinois indicates that up to the time when this report was written, from 50 to 60 per cent of the scale on both apple and peach are alive.

Wisconsin — S. B. Fracker: Present in about ten cities and villages of the southeastern part of the State. Not more than 30 to 40 farm orchards infested. Apple and plum trees occasionally killed but no other economic damage. This insect has apparently been eradicated by persistent spraying and destruction of infested shrubbery at LaCrosse, where it was discovered about 1921. Otherwise the San Jose scale is not known in the State north and west of a line drawn from Beloit through Madison to Cedarburg in Ozaukee County, except for a few infested trees and shrubs in the city of Sheboygan. The winter of 1924 and 1925 gave the scale a pronounced setback so that the injury in 1925 in the infested, unsprayed orchard, was less than it had been for two previous seasons.

C. L. Fluke: We have not made any counts on the San Jose scale. It occurs, of course, through certain parts of the southern part of Wisconsin, but I believe is not any more numerous than usual.

Minnesota — A. G. Ruggles: The San Jose scale was introduced by a nurseryman through distribution of some New York nursery stock. We have followed up all of these shipments and destroyed all of those with the scale on them. I have seen no San Jose scale outside of these few isolated cases.

Iowa — Carl J. Drake: The San Jose scale is found only in southeastern Iowa and almost all of the Iowa nurseries are located outside of the San Jose scale region. Some commercial damage is being done by this insect in the southeastern portion of the State.

Missouri — L. Haseman: The situation is entirely satisfactory but must be followed carefully as the pest is undoubtedly recovering again from its setback of the last two years.

Arkansas — Dwight Isely: The San Jose scale is fairly well under control in northwestern Arkansas. The scale is present in practically all orchards, but not in unusual numbers and at present is causing no alarm.

South Dakota — H. C. Severin: The San Jose scale, so far as we know, is not found in South Dakota. It was introduced on several different occasions but in each case eradicated.

Kansas — H. B. Hungerford: The San Jose scale is coming well under control in Kansas. The Entomological Commission has been given some financial support and by the means of this has carried on survey and control work at least sufficient to protect the nurseries and commercial orchards in the southern half of the State.

Colorado — C. P. Gillette: The San Jose scale is present in small numbers in a few orchards in Mesa County, and, so far as I can determine at the present time, does not occur in any other section of the State. However, there has been a small infestation in Delta County that Mr. Newton has been endeavoring to control for a few years. This past summer he has not been able to find a single specimen to indicate the presence of the scale, though it is probable that it will turn up again in the future.

Idaho — Claude Wakeland (Annual Report 1925): The fact of greatest economic importance concerning the San Jose scale in Idaho during the past season is that in many sections of the State it was entirely controlled by the unusually extreme temperatures of last December and that many orchardists dispensed completely with the usual dormant spray. The Experiment Station made many examinations for fruit growers, horticultural inspectors, and others interested to determine the effect of the cold and as a result of this work many thousands of dollars were saved that would ordinarily have been expended for spraying. It is considered unsafe to dispense with the usual dormant spray under ordinary conditions even though the infestation is light, but the entomologist took the position in this case that where natural conditions had already controlled the insect to a greater degree than good spraying will under average conditions, it was probable that the cost of spraying would be much greater in many instances than the benefit derived.

Scale-infested branches and twigs were collected by the entomologist or sent in to him by farmers or inspectors from all of the chief fruit growing areas of southern Idaho. These were carefully examined under the binocular and each individual scale turned over with a

needle to determine whether it was alive or dead. Only partially mature insects were included in the records kept of each examination. A total of 90 examinations were made which yielded the following data:

| | |
|---|---|
| Total scales counted | 40,853 |
| Total scales dead | 39,625 |
| Per cent of scales alive | 3.00 |
| Total scales alive above snow line | 229 |
| Percentage of scales alive above snow line | 0.51 |
| Total scales alive below snow line | 999 |
| Percentage of scales alive below snow line | 2.49 |

Of all the insects examined, only 0.51 per cent were alive that occurred above the snow line of the previous winter and the scales that made this percentage in the entire count came from but a very few orchards in certain districts where the temperature had been less extreme than in most communities. The protection that the snow affords is evidenced by the fact that the average of 2.49 per cent was obtained by the examination of only seven twigs that had been below snow line. On these twigs 3355 scale insects were examined of which 1439 were alive. Thus of all the scales examined on wood which had been covered with snow, 42.89 per cent were found to have survived the winter. Wefe it not that there are often trees that have been blown over or that have branches hanging down, or for water sprouts at the bases of trees which often are infested with the San Jose scale, natural control in large areas of southern Idaho would have been complete. There are localities in which the increase of scale will be very slow for a time and doubtless it will be safe to omit the dormant spray in some orchards again in 1926 if examination shows that the orchards have not become reinfested. Considerable information was obtained concerning the temperature which is fatal to the San Jose scale in this State. Records show that where the temperature reached a minimum of 26 degrees below zero there were, with one exception, no scale survivals. All live insects were obtained from communities where the minimum temperature was warmer than -26, a few were found alive at -24 degrees F. (January 12): I have talked with numerous State horticultural inspectors recently and it is quite evident that we can expect little injury from this insect in 1926. It was only in a few restricted districts that scale-marked apples were found at harvest time in 1925 and, with one exception, these districts were those in which a small percentage of scales were found to be alive by microscopic examinations following the cold weather of last winter. There are whole areas in which no scales affected the fruit during the past season and it appears to me that we will have little injury in those districts in 1926. It is true that there has been a holdover of live insects on willows and on watersprouts that were below the snow line, but spread from these sources has not yet reinfested the fruiting areas of trees and it appears that control will not be practiced excepting in those districts mentioned.

Arizona

Oscar C. Bartlett: The San Jose scale is now pretty well spread over this State whereever fruit trees are growing.

Nevada — George G. Schweis: The only insect that has become thoroughly established in this State is the San Jose scale. This insect seems to have a wide distribution, and without doubt covers the entire State whereever deciduous trees are grown. A survey has not been made in the southern portion of the State recently, but we are inclined to believe that it exists there also.

California — T. D. Urbahns: The San Jose scale has a general distribution in practically all of the orchard districts of California, but is held in check in good condition in commercial orchards with a regular system of orchard spraying. It sometimes becomes quite destructive in neglected orchards or trees in back yards, and if left uncontrolled in commercial orchards would probably take the orchard in the course of a few years.

## BOLL WEEVIL (Anthonomus grandis Boh.)

Virginia — W. J. Schoene: I personally made a scouting trip for the boll weevils on the 25th and 26th of September, and I am giving you that data herewith. In company with Mr. Underhill, I scouted the territory from Richmond to Emporia south, and from Lawrenceville through Drewryville, Franklin, and Suffolk. The insect was readily found in cotton fields ten miles north of Emporia. Also either the insect itself or evidence of the work was found in practically every field visited from Lawrenceville to Suffolk. Owing to the prolonged dry weather, many of the fields of cotton had fully matured, and in some the cotton had been picked before the dates mentioned. The plants in such fields were thoroughly dry and no weevils present, but wherever there happened to be a green plant the insects were readily found, though in small numbers; and no evidence of any injury was noticed except near Franklin and Suffolk. In this region the insect was present in all stages though not so numerous as noted at Suffolk in 1923.

North Carolina — Z. P. Metcalf: Mr. W. Bruce Mabee, Extension Entomologist, advises me that less than the usual number of cotton boll weevils went into hibernation, and that they went into hibernation earlier than usual this year. It is natural to expect, therefore, that fewer will survive the winter than in the average season.

Missouri — L. Haseman: To my knowledge no weevil appeared in southeastern Missouri last summer. No complaints of it were received and no samples, though a few years ago we had a fair sprinkling.

Arkansas — Dwight Isely: Injury by the cotton boll weevil was relatively light when compared with that of 1923. However, it was much more general than in 1924. Late in the season weevils could be found in all parts of the cotton belt in large numbers, and the number which went into hibernation was several times greater than in the fall of 1924.

Louisiana — W. E. Hinds: Boll weevils were scarce generally through the past summer in the northern half of the State and in the eastern section. They developed abundantly in such fields as were not stripped by the cotton worms, during September and October. The

occurrence of weevils at time of killing frost was decidedly irregular or spotted. Where they were present in any considerable numbers, they were likely to be decidedly abundant and in other localities very scarce.

At Baton Rouge we found weevils far more abundant and easily obtained for our hibernation cage work than during the fall of 1924. I believe that through the State as a whole more weevils are in hibernation at this time than existed a year ago.

Minimum winter temperatures for this year are some 10 degrees below those of 1924 to 1925, but in no section except possibly the extreme northern portion has the temperature been low enough to destroy any unusual proportion of overwintering weevils thus far.

Killing frosts occurred in central Louisiana about November 20, enabling boll weevils to enter hibernation completely after that time. Limited examinations of Spanish moss indicated that there is a high initial population in such shelter this season.

B. R. Coad: To some it may seem early to start considering boll weevil prospects for 1926, but in reality we already have a very important index to what may be expected. Everyone knows, of course, that the rate of survival through the winter is very definitely determined by the winter weather, but at the same time, it should also be remembered that the number of weevils actually entering hibernation in the fall is probably of almost equal importance. There seems to be a rather general idea that owing to the light weevil damage to the cotton crop of 1925 there would be only a small number of weevils in hibernation at the present time. In past years this station has of course devoted greatest attention to the early spring examinations for the purpose of determining weevils which have survived the winter, but in some past seasons fall records of weevils entering hibernation have been made. Recent observations indicate the great importance of these fall records. These have been concentrated around Tallulah, Louisiana, being made on a series of about fifteen plantations within a radius of thirty miles of Tallulah. Table Number 1 summarizes these records for past years as far as they are available.

Table No. 1
RECORDS FOR PAST YEARS ON WEEVILS ENTERING HIBERNATION AT TALLULAH, LA.

| Year | Live Weevils per Ton of Moss |
|---|---|
| 1915 | 737 |
| 1916 | 133 |
| 1917 | 137 |
| 1923 | 229 |
| 1924 | 16 |

From this it will be noted that in more or less normal years from 130 to 200 weevils per ton of moss seem to represent an average

population going into hibernation in the fall. Nineteen hundred and fifteen showed an abnormally heavy population; while 1924 showed a phenomenally light one, and this was, of course, followed by the light emergence in the spring of 1925.

This fall the Department of Agriculture has started a more extensive series, bringing in other localities, in cooperation with the State agricultural workers in the various districts. It is planned to extend and continue this in future years, but the observations this season have included the following points:

| | |
|---|---|
| Tallulah, La. | Washington, N. C. |
| Crew Lake, La. | Florence, S. C. |
| Lake Providence, La. | Moncks Corner, S.C. |
| Opelousas, La. | Hamberg, S. C. |
| Washington, La. | Valdosta, Ga. |
| Lafayette, La. | Bainbridge, Ga. |
| Fairbluff, N. C. | Donaldsonville, Ga. |

The examinations at these are summarized in Table Number 2.

Table No. 2

WEEVILS ENTERING HIBERNATION AT VARIOUS POINTS IN FALL OF 1925

| Locality | Live Weevils per Ton of Moss |
|---|---|
| TalTulah, La. | 280 |
| Average northern Louisiana | 330 |
| Average southern Louisiana | 1581 |
| Average North Carolina | 430 |
| Average South Carolina | 52 |
| Average Georgia | 39 |

The Tallulah record is, of course, of primary interest as being directly comparable with those available in past years. It will be noted that it is higher than every year but one in the past where records are available and that it is decidedly above what might be called a normal average population based on the past records. This is further borne out by the average of all records made in northern Louisiana; while southern Louisiana shows an enormously heavy population. North Carolina similarly shows many weevils in hibernation, while the number is much lighter at the South Carolina and Georgia points examined. These figures do not mean, of course, that any such numbers of weevils are going to survive the winter, but they do give our first index of the weevils which may be available for infestation next spring. Certainly, there seems no ground for the belief that the light damage this past season was followed by a very light movement of weevils into hibernation. Throughout much of the territory, conditions in the fall were fairly favorable for weevil breeding

after the crop has been made. Final killing frosts were generally comparatively late and large numbers of weevils were bred during September to enter hibernation. In South Carolina and Georgia practically all points examined are located in the belt of comparatively light, sand soil where the plants matured early and did not have this heavy second growth. In North Carolina there was a heavy second growth and ideal conditions for large numbers of weevils to breed and enter hibernation.

The significance of the foregoing, as far as the cotton farmer is concerned, is the fact that in spite of the high degree of climatic control of the weevils during the past two years, they finally succeeded in entering hibernation in at least normal abundance in much of the Cotton Belt this fall so that it is again a question of winter temperature followed by summer climatic conditions which will determine damage to the crop next year. In other words, as far as present conditions indicate, there is absolutely no reason for the farmers to believe that the comparative immunity of the past two years will be continued next season.

Arizona

Oscar C. Bartlett: The cotton boll weevil appeared in two fields of cotton at Continental, Ariz., which is about 30 miles south of Tucson. There were two small infestations of it, each one less than one-half acre in extent. The infestation not severe. This infestation was caused by the so-called wild boll weevil or Thurberia weevil. It moved into domestic fields from wild cotton plants.